

REMARKSRECEIVED
CENTRAL FAX CENTER

FEB 08 2007

Summary

Claim 21 has been currently amended to depend from claim 20 rather than itself. No new matter was added as a result. Applicants respectfully request reconsideration of the rejections of claims 1-21, including independent claims 1, 12 and 20.

35 U.S.C. § 103(a)

Claims 1-6, 12, 13, 15, 16, and 20 were rejected pursuant to 35 U.S.C. § 103(a) as being unpatentable over Baumgartner, et al. (U.S. Patent No. 2004/0113524) in view of Shen, et al. (U.S. Patent No. 5,536,958) and Amano (U.S. Patent No. 7,032,454).

Claim 1

The Examiner argues that Baumgartner, et al. disclose all the limitations of claim 1 except for "a voltage limiting circuit connected with the conductor." (Office Action, page 2). The Examiner argues that Shen, et al. disclose voltage limiting circuits (diodes 25 and 29) in Figure 4 and says that it would have been obvious to one of ordinary skill in the art to have modified Baumgartner, et al. with the voltage limiting circuit of Shen, et al. (Office Action, page 3). However, a person of ordinary skill in the art would not have used the teachings of Shen, et al. with the device of Baumgartner, et al.

First, Shen, et al. is not analogous art. It is not in the same field of endeavor, and it is not reasonably pertinent to the particular problem with which the Applicants are concerned. The Applicants are concerned with damage to flexible membranes, such as a membrane being fused in a bottomed-out position, in regards to transducer devices, specifically capacitive membrane ultrasound transducers ("CMUTs"). (Applicants' specification, paragraph 2). However, Shen, et al. address the problem of overvoltage protection of transistors, not flexible membranes or CMUT. (Column

4, lines 48-62). It is not appropriate to generally point to any references dealing with overvoltage protection that do not deal with flexible membranes or CMUTs.

Second, there is no motivation or suggestion to combine the references.

Shen, et al. address the problem of protecting against voltages in the excess of 500 volts involving a single chip solution (column 2, lines 50-55), while Baumgartner, et al. deal with lending additional support to membrane ultrasound transducer devices while enhancing the ability to damp undesirable acoustic waves (paragraph 10).

The Examiner argues that there is a motivation or suggestion to combine the references by citing the "Background" section of Amano. (Office Action, page 2). Again, Amano is not analogous art because when viewing it as a whole, Amano deals with piezoelectric cantilever pressure sensors, not semiconductor based flexible membranes or CMUTs. In regards to the "Background" of Amano, column 1, lines 62-64 disclose that capacitance sensors are vulnerable to electric field and electrostatic discharge. However, this section is discussing active capacitive sensor arrays to capture fingerprint images (column 1, lines 50-51), not flexible membranes or CMUTs. Amano discloses that when live skin of a finger is in close proximity of a sensor plate, feedback capacitance is generated, and a fingerprint image may be captured by the sensing of the feedback capacitance. (column 1, lines 55-62). That does not show that flexible membranes or CMUTs are in need of overvoltage protection because flexible membranes and CMUTs are not used for sensing capacitance. Flexible membranes and CMUTs vibrate based on electrical signals to produce acoustic signals; they are not involved with sensing capacitance. Therefore, Amano does not show motivation or suggestion to combine the teachings of Baumgartner, et al. and Shen, et al. The Examiner is using impermissible hindsight. Accordingly, a person of ordinary skill in the art would not realize the necessity of protecting capacitive membranes against overvoltages using the limitations of the Applicant's claim.

The *prima facie* case for obviousness has not been met and, therefore, claim 1 is allowable over the cited references. Claims 2-11 depend, directly or indirectly, from independent claim 1 and, therefore, are allowable for at least this reason.

Further limitations distinguish from Baumgartner, et al., Shen, et al. and Amano, resulting in these claims being allowable.

Claim 2 recites an electrode on the flexible membrane and a signal trace connected to the electrode. The Examiner argues that a signal trace is inherently connected with the electrode (Office Action, page 3), but it is not inherent because a common ground plate, not a signal trace, may be connected to the electrode.

Claim 3 recites at least one Zener diode connected between the conductor and ground, but Figure 4 of Shen, et al. discloses the diodes being connected between a gate 26, source 24, and drain 27 of a transistor with no showing of a ground connection.

Claim 5 recites that the voltage limiting circuit comprises a first voltage source and a first diode connected between the conductor and the first voltage source. Shen, et al. do not disclose this arrangement. The Examiner argues that ground (which is not shown in Shen, et al.) is a voltage source, but ground is zero potential and is not a voltage source.

Claim 6 recites a second voltage source with a negative voltage and the first voltage source has a positive voltage with a second diode connected between the conductor and the second voltage source. Shen, et al. does not teach this. Shen, et al. disclose diodes connected between the gate, source, and drain of a transistor (Figure 4), so there is no showing of positive and negative voltage sources.

Claims 12 and 20

Independent claims 12 and 20 are allowable for at least the same reasons given in regards to claim 1. Claims 13-19 depend, directly or indirectly, from independent claim 12 and, therefore, are allowable for at least this reason. Claim 21 depends from independent claim 20 and, therefore, is allowable for at least this reason.

Claims 7 and 14 were rejected pursuant to 35 U.S.C. § 103(a) as being unpatentable over Baumgartner, et al. in view of Shen, et al., Amano, and Van Kraukauer, et al. (U.S. Patent No. 5,617,283).

As mentioned above, there is no suggestion or motivation to combine the teachings of Baumgartner, et al., Shen, et al., and Amano. Furthermore, claim 7 recites, *inter alia*, that the voltage limiting circuit comprises a switch operable to short the first electrode to the second electrode, and claim 14 recites a method of draining current away from at least one of the first and second electrodes. Column 4, lines 9-21 of Kraukauer, et al. disclose an ESD clamp device 18 to shunt ESD voltages between a pad 12 and a ground reference potential Vss. However, Kraukauer, et al. is not analogous because it relates to electrostatic discharge protection of integrated circuits, not flexible membranes or CMUTs. Also, there is no suggestion or motivation to combine Kraukauer et al. with the cited references.

Claim 8 depends from claim 7 and, therefore, is allowable for at least this reason.

Claims 9-11, 18, 19, and 21 were rejected pursuant to 35 U.S.C. § 103(a) as being unpatentable over Baumgartner, et al. in view of Shen, et al., Amano, and Wagner, et al. (U.S. Patent No. 5,430,595).

As mentioned above, there is no suggestion or motivation to combine the teachings of Baumgartner, et al., Shen, et al., and Amano. Furthermore, claims 9-11, 18, 19, and 21 recite that at least one component of the voltage limiting circuit is within a transducer probe or transducer connector and integrated with a preamplifier, respectively. Wagner, et al. do not teach these limitations. The Examiner argues that Figure 2 of Wagner, et al. discloses protecting diodes (elements 21 and 22) being positioned adjacent to transistors 41 and 42 (Office Action, page 6), but there is no teaching of transducer probes, connectors, or preamplifiers. Additionally, Wagner, et al. is not analogous and there is no suggestion or motivation to combine Wagner, et al. with the cited references because Wagner, et al. relates to electrostatic discharge

RECEIVED
CENTRAL FAX CENTER

FEB 08 2007

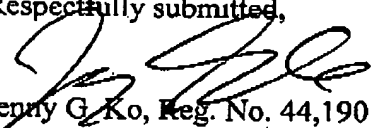
CONCLUSION:

Applicant respectfully submits that all of the pending claims are in condition for allowance and seeks early allowance thereof. If for any reason, the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, he is respectfully requested to call the undersigned at (650) 694-5810 or Craig Summerfield at (312) 321-4726.

PLEASE MAIL CORRESPONDENCE
TO:

Siemens Corporation
Customer No. 28524
Attn: Elsa Keller, Legal Administrator
170 Wood Avenue South
Iselin, NJ 08830

Respectfully submitted,



Jenny G. Ko, Reg. No. 44,190
Attorney(s) for Applicant(s)
Telephone: (650) 694-5810
Date: 2/7/07